



US006602248B1

(12) **United States Patent**  
Sharps et al.

(10) Patent No.: **US 6,602,248 B1**  
(45) Date of Patent: **\*Aug. 5, 2003**

(54) **METHODS FOR REPAIRING DAMAGED INTERVERTEBRAL DISCS**

(75) Inventors: **Lewis Sharps**, Bryn Mawr, PA (US); **David C. Hovda**, Mountain View, CA (US); **Jean Woloszko**, Mountain View, CA (US); **Hira V. Thapliyal**, Los Altos, CA (US); **Philip E. Eggers**, Dublin, OH (US)

(73) Assignee: **Arthro Care Corp.**, Sunnyvale

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/676,194**

(22) Filed: **Sep. 28, 2000**

#### Related U.S. Application Data

- (63) Continuation-in-part of application No. PCT/US00/13706, filed on May 17, 2000, which is a continuation of application No. 09/316,472, filed on May 21, 1999, which is a continuation-in-part of application No. 09/295,687, filed as application No. 09/054,323 on Apr. 2, 1998, and a continuation-in-part of application No. 09/268,616, filed on Mar. 15, 1999, which is a continuation-in-part of application No. 08/990,374, filed on Dec. 15, 1997, which is a continuation-in-part of application No. 08/485,219, filed on Jun. 7, 1995, which is a continuation-in-part of application No. 09/026,851, filed on Feb. 20, 1999, and a continuation-in-part of application No. 08/690,159, filed on Jul. 18, 1996.
- (60) Provisional application No. 60/224,107, filed on Aug. 9, 2000.

(51) Int. Cl.<sup>7</sup> ..... **A61B 18/14**

(52) U.S. Cl. .... **606/32; 606/41; 604/35; 604/114; 607/105; 607/113**

(58) Field of Search ..... **606/32, 34, 41, 606/49; 607/99, 105, 113; 604/35, 114; 128/898**

(56) **References Cited**

#### U.S. PATENT DOCUMENTS

6,073,051 A \* 6/2000 Sharkey et al. .... 606/27  
6,277,112 B1 \* 8/2001 Underwood et al. .... 604/114

\* cited by examiner

Primary Examiner—Lee Cohen

(74) Attorney, Agent, or Firm—John T. Raffle; Richard R. Batt

(57) **ABSTRACT**

Apparatus and methods for treating an intervertebral disc by ablation of disc tissue. A method of the invention includes positioning at least one active electrode within the intervertebral disc, and applying at least a first high frequency voltage between the active electrode(s) and one or more return electrode(s), wherein the volume of the nucleus pulposus is decreased, pressure exerted by the nucleus pulposus on the annulus fibrosus is reduced, and discogenic pain of a patient is alleviated. In other embodiments, a curved or steerable probe is guided to a specific target site within a disc to be treated, and the disc tissue at the target site is ablated by application of at least a first high frequency voltage between the active electrode(s) and one or more return electrode(s). A method of making an electrosurgical probe is also disclosed.

**57 Claims, 47 Drawing Sheets**

